

Jet Propulsion Laboratory

INTEROFFICE MEMORANDUM

930-04-010-AEA/ESB: lc

August 3, 2004

TO: J. A. Wackley

FROM: E. S. Burke

SUBJECT: Minutes for the DSS-45 Downtime Readiness Review (DTRR) held July 12, 2004.

DSS-45 Downtime Readiness Review

The DSS-45 DTRR was held on July 12, 2004 at JPL, with Canberra staff participating via teleconference link, and Asim Sehic and Seyavosh Ghamari presenting. The DTRR was conducted to review and assess the readiness for all activities planned for the task, scheduled to begin August 9, through December 5, 2004. The presentation for the Life Extension task was given during this review. All other NIB tasks associated with this downtime will be presented at a follow-up meeting on August 4, 2004.

A complete accounting of the meeting can be viewed on the RAPSO DTRR website, including the presentation material and Action Item list: <http://rapweb.jpl.nasa.gov/DTRR.html>

Review Board

Gene Burke, Chairman.....	DSMS Operations, DSN RAPSO Manager
Wayne Sible	DSMS Implementation Engineering
Jim Buckley	DSMS Operations Representative
Michael Coluzzi	ITT, O&M Contractor Engineering Manager
Ezra Abrahamly	DSMS Safety Engineer
Jean Patterson	Antenna Maintenance Specialist, Div 33 Technical Representative
William Dobie.....	CDSCC Representative
Bruce Wiley	CDSCC Antenna and Facilities Manager
Art Andujo	Board Secretary

Attendees

Andujo, Art	Ghamari, Seyavosh	Patterson, Jean
Buckley, Jim	Hames, Peter	Sehic, Asim
Burke, Gene	Hampton, Sherill	Sible, Wayne
Churchill, Peter	Kruzins, Ed	Van Sickler, Peter
Coluzzi, Michael	Lehr, Don	Watzig, Gary
Cucchissi, John	Link, Christopher	Welch, Susan
Dobie, Bill	McNicholas, Desmond	Wert, Mike
Feria, Alfonso	Murray, John	Wiley, Bruce
Gama, Eric	Osman, Jeff	

Introduction – *G. Burke*

The Downtime Readiness Review Board was introduced and the Downtime Readiness Review Process Definition was discussed.

DSS-45 life Extension Task Review: – *A. Sehic and S. Ghamari*

- **Task Summary**
- **Task Status**
- **Dependencies**
- **Modkit Status**
- **Spares Status**
- **Test Plan Status**
- **Schedule status**
- **Training Requirements**
- **Task Resources**
- **Installation Issues**
- **Genesis Return to Earth Impact**

Task Summary

The following lists work to be completed during the DSS-45 Life Extension downtime:

- Azimuth Track replacement will include a thicker wearstrip, increased number of wearstrip bolts, epoxy grout, sloped runner and improved splice connection.
- Pintle Bearing replacement will include an improved seal design, additional grease reliefs, lower bearing to correct flexure plate alignment.
- Azimuth Drive replacement will include new wheels (BWG design), bearings, seals, brakes, idler housing modification, planetary gear reducers (BWG design), motors, couplings.
- Elevation Drive replacement will include new planetary gear reducers (~BWG), brakes, motors, couplings, back-up rollers.

Task Status

Preparations that have been completed, as well as plans for work up to, and during, the downtime were discussed.

- A detailed schedule has been developed, but the schedule provided does not address other tasks that will be completed NIB during the downtime period. It has been requested that the Mr. Sehic provide a new schedule that includes details of all tasks to be completed during the downtime. (RAF #9)
- Modkits have been signed and are or will be delivered at least three weeks before the start of the downtime. Pre-installation testing has been completed and the OE is reviewing the installation instructions.
- The hardware required for the task is or will be on-site by the start of the downtime; the pintle bearing is expected to arrive by August 2; the gearboxes are expected to arrive on July 20; the azimuth track, pintle bearing support plate, wheels, pintle bearing flexure plate, wiper blocks, motor adapters are expected on-site by July 23;

all other hardware such as the motors and epoxy grout are already on-site. Spares are or will be available on-site by the start of the downtime.

- MTC will provide all tools and manpower required to perform the antenna life-extension work during the downtime. The only training necessary will be for the gear reducers. All materials are ready and training for the maintenance personnel has been scheduled.

Dependencies

The following is a list of the dependencies that will affect the success of the downtime.

- It was determined that the listed dependency for the installation of resistors in the ACS and subsequent Modkit for the servo drive is not necessary but a realignment and calibration of the drive cabinet should be included in the hardware installation procedure (HIP) document, and these tasks should be included as part of the testing and commissioning phase of the downtime. It was also pointed out that the antenna should not be operated until these tasks are completed (RFA #3).
- There is an associated task described in a separate ECR prepared by Tim Sink to install jacking pads. It has been reported that the station personnel will have completed 60% of the jacking pad installation by August 9, and complete the work by the first week of the downtime. Work has been ongoing during scheduled maintenance periods and NIB to operations.
- USC implementation has been determined not to be a dependency to the Life Extension task, but a major component of the downtime, and should be integrated in the detailed schedule. There is, however, the issue of scheduling the USC task during the last two weeks of the downtime. It needs to be determined that the work for this task will not interfere with the testing and demos that are to occur in this period. (RFA #7)
- The station personnel have identified and inspected the cables for the cable wrap system, and have determined them to be in good shape. They will be responsible for any necessary cable cuts and repairs. Mr. Murray stated that the station has the resources available to repair damaged cables. It has been agreed that stability SPT's will be required due to the cutting and splicing done to the Sumitomo fiber optics cable. They are confident that they can repair any damaged or cut cables.

Modkit Status

The status of Modkits associated with the life extension task was discussed. The Drive and Mechanical Assembly Modkit has been signed and was delivered to the DLF on July 7. At this time there are 2 liens left to address: the HIP; and the OMM. The OE, Bill Dobie, Asim Hesic and MTC engineers are reviewing these for deficiencies. There are some issues with the Track Installation Procedure in the HIP that are being addressed. The OMM is complete, but is being reviewed for accuracy. The MSA is in place and signed. The ASC Modkit was expected to ship on July 30.

Spares Status

The spares required by the life extension task, to be provided to the station, were discussed as described in MSA #39. The new spares provided are required due to the unique design of the DSS-45 planetary gear reducers. The station stated that the unique spares listed are

adequate to support the antenna, as well as additional spares compatible with the BWG antenna. Azimuth and Elevation motors are of the same type as the existing motors, therefore existing spares will be sufficient. Additionally, the motors used on the antenna prior the downtime will be available as spares, if they are recertified to operate at higher speeds by the manufacturer.

Safety Plan Status

Station personnel have reviewed the safety plan produced by MTC and comments have been captured, worked into the document, and resubmitted for review. The station personnel feel the plan is good, but would like to see more detail, preferably at the task level. They would also like to have clearly stated how the environmental issues are to be addressed. B. Wiley is to ensure that G. Smee provide safety and environmental impact document feedback and requirements to S. Ghamari, for incorporation into the safety plan. B. Dobie stated that no work will commence without an approved safety plan. The signed System Safety Checklist has been submitted to F. Battle and E. Abraham, as required.

Test Plan Status

The Operations Engineers are working with station personnel to develop a test plan. S. Hampton discussed some SPT's that should be scheduled, citing the three that should be required as the phase noise tests, downlink gain and bandwidth test, and some telemetry bit-error rate tests. The required tests should sufficiently certify that the antenna is operational, as well as validate the condition of the cabling. At this time an Operations Test Plan has not been developed but the action has been assigned to M. Coluzzi to ensure that a plan is developed. (See RFA #6) A test plan should also be developed to assess baseline performance prior to the downtime. M. Coluzzi and S. Hampton have been assigned the action to develop a pre-installation test plan. (See RFA#5)

Schedule Status

The task schedule highlighting the major milestones and the dates reviewed. It has been determined that the schedule is nearly complete for the life extension task, but that it does not cover the overall downtime including the associated NIB tasks. An action was assigned to prepare a complete schedule of all work to be done during the downtime. (See RFA #9)

Training Requirements

There is no training required for the maintenance personnel because of the modifications made to the antenna in this downtime. The systems in place after the task will be identical to existing systems, or to systems on the DSS-34 Beam Waveguide antenna, which the maintenance teams already have experience with. However the modifications are addressed in the OMM.

Task Resources

The task managers have stated that the contractor MTC, will provide all transportation, food, manpower and tools, as described in the contracts. Some special tools were made by MTC during previous work to other antennas and have been stored at the station to be used during this downtime. The station will only be responsible for the work to the cable wrap and cable cutting, and repairs if necessary. This portion of the work has already been

negotiated with the station.

Installation Issues

The epoxy grout to be used on the azimuth track is temperature sensitive and contingencies have been planned for providing heat sinks and tenting material, in the event of extreme weather during the period of installation. The task manager will draw up the contingency plan to address this issue, and present it to the Review Board. (See RFA #8)

Genesis Return to Earth Impact

It has been discussed that the planned Genesis return to Earth events may interfere with the completion of the Life Extension task. The Genesis spacecraft is to pass by the Earth and release the sample capsule. If the mission is not successful in returning the capsule to Earth as designed, the mission will implement a plan to modify the trajectory and attempt the capsule return at a later date. In the event that the mission implements its backup plan, the DSN will be required to provide a heightened level of support in January of 2005, requiring DSS-45 to return to service at least 60 days prior to the critical event. The task managers have provided three contingency plans to return the antenna to service by November 1, 2004. The options are as follows:

- Forego the pintle bearing installation. Nominally schedule the pintle bearing replacement work to be done at the end of the downtime period.
- Forego the elevation drive installation. Nominally schedule the elevation drive installation work to be done at the end of the downtime period.
- Work extended hours and complete all tasks. Requires use of weather contingency.

The task team has decided that to forego the pintle bearing replacement is the best option, and will plan the task around that. This will be implemented if the Genesis mission needs to implement their backup plan by September 9, 2004. The antenna will then be returned to service on November 1, 2004. The Genesis commitment has required several changes made to the task schedule, subsequently these changes will be made to the HIP.

Board Summary:

The Board has reviewed each of the success criteria and determined that too many issues are outstanding to proceed with the downtime at this time. Therefore a follow-up meeting has been scheduled for August 4, 2004 to ensure that the RFA's and other areas of concern are addressed. Comments provided by each of the Board Members are as follows:

Jim Buckley – Several items that were discussed require resolution before he would recommend proceeding with the downtime. A follow-up meeting needs to be held before the start of the downtime to discuss the completion of the RFA's. He will schedule an OCR (Operations Commitment Review) around December 1, to ascertain the readiness of the antenna to return to service.

Mike Coluzzi – Too many issues are yet to be resolved, and the follow-up review is appropriate. He committed to assist the task team to close the open RFA's.

William Dobie – It was requested that another review be scheduled to address the open RFA's particularly the HIP and antenna drawings.

Bruce Wiley – Another review is necessary before agreeing to proceed with the task. He would like to see improvements to the schedule, and some more information regarding the Genesis Contingency plans to better organize resources.

Peter Churchill – He would like to be certain there is enough time allowed for the cable wrap work to be done before the pintle bearing work begins, and would like more information regarding the USC installation on August 4.

Jean Patterson – Agreed that the follow-up review is necessary to answer the many outstanding questions such as the integrated schedule, the HIP and the Safety Plan.

Wayne Sible – Agrees with all the comments so far, but would like to see the actions distributed as soon as possible. Agreed that the task is not ready to proceed, but is confident that all items will be addressed, the team will be ready for the downtime, and all questions will be answered.

Jeff Osman – Stated that this should not be considered a successful Downtime Readiness Review, and that it will require another review.

Gene Burke – Agreed that there should be a follow-up review and proposed August 4, 2004 to hold the review. Although many issues have been brought to light, he is confident that the task team will be ready by August 4th.

Action Items (AI's):

1. Asim Sehic will provide information regarding the delivery status of the required hardware, particularly the Wiper Blocks. (See RFA #1)
2. Asim Sehic will present plans for re-establishing changed station reference location information after replacing pintle bearing and moving azimuth axis. (See recommendations from Mike Wert RFA #2)
3. Asim Sehic will include instructions to re-align drive electronics before operating antenna with new gear reducers in the HIP. (See RFA #3)
4. Asim Sehic will present plans for antenna pointing re-calibration. (See RFA #4)
5. ITT/DSN will create a pre-downtime test plan to develop an antenna performance baseline. (See RFA #5)
6. ITT/DSN will create a post-downtime test plan to evaluate antenna performance. (See RFA #6)
7. Asim Sehic will include the NIB USC task in the integrated schedule and verify that the task does not interfere with system testing and demos. (See RFA #7)
8. Asim Sehic will present contingency plans for ensuring grout curing is not affected by adverse weather conditions. (See RFA #8)

9. Asim Sehic will provide an overall integrated downtime schedule including all NIB tasks to be completed during the downtime period. (See RFA #9)
10. Bruce Wiley has been tasked to ensure that Garry Smee provides safety and environmental impact document feedback and requirements to Seyavosh Ghamari for incorporation into the safety plan.
11. Peter Van Sickler has been assigned the action to ensure that the station provides the DLF with ConAudit information for the hardware being delivered directly to the station from the manufacturer, in order to ensure that the hardware is properly tagged and entered into the DSN parts-tracking and inventory system.